PROC (BAYL UNIV MED CENT)
2021;34(5):606–607

https://doi.org/10.1080/08998280.2021.1922253

Taylor & Francis
Taylor & Francis Group

Eosinophilic annular erythema

Nicole Dacy, MD[a], Kyle Oney, BS[b], Katherine Fiala, MD[a], and Palak Parekh, MD[a]

[a]Department of Dermatology, Baylor Scott & White Medical Center – Temple and Texas A&M College of Medicine, Temple, Texas; [b]College of Osteopathic Medicine, A.T. Still University, Kirksville, Missouri

ABSTRACT

Eosinophilic annular erythema (EAE) is a rare eosinophilic dermatosis characterized by annular, erythematous papules and plaques commonly found on the trunk and the extremities. There is continued debate on whether EAE is a distinct entity or a clinical polymorphism of Well's syndrome, but it is generally considered a separate entity based on clinical and histopathological differences. We present a case of EAE and discuss the histopathological findings.

KEYWORDS Annular erythema; eosinophilic annular erythema; Well's syndrome

Eosinophilic annular erythema (EAE) is a rare eosinophilic dermatosis characterized by annular, erythematous papules and plaques commonly found on the trunk and the extremities.[1] Virtually all areas of the body can be affected by EAE, including the palms and soles.[2] The lesions evolve with a centrifugal growth pattern with central areas of clearing and are typically either asymptomatic or pruritic.[1] EAE typically resolves spontaneously in months to years with no atrophy or scarring, but many patients will have multiple recurrences.[3] Multiple chronic diseases have been linked to EAE, including chronic kidney disease, diabetes mellitus, hepatitis C, Churg-Strauss syndrome, autoimmune thyroid disease, and chronic gastritis with *Helicobacter pylori*.[4,5] EAE has also been rarely linked to malignancies such as renal clear cell carcinoma and metastatic prostate cancer.[4] There are a limited number of case reports of EAE, so we present a case to discuss the salient histopathological findings and differential diagnosis.

CASE DESCRIPTION

A 61-year-old woman presented to the dermatology clinic with a 2-week history of lesions that began on her chest and spread to her face, arms, and legs. The lesions were erythematous and raised with central clearing without any accompanying scale, pruritus, drainage, or pain. Annular and semilunar plaques were found on the temple, central chest, shins, distal thighs, forearms, scalp, back, and abdomen *(Figure 1a)*.

The patient reported possible mold exposure at her employment. She was initially seen by her primary care physician and was treated with triamcinolone 0.1% cream without improvement. She subsequently failed to improve with doxycycline, permethrin, and clobetasol cream. Laboratory studies, including complete blood count, renal and liver function tests, and angiotensin-converting enzyme level, were all unrevealing. Screening antibodies for HIV 1/2, hepatitis B and C, *Aspergillus*, bullous pemphigoid, and tuberculosis were negative. The clinical differential diagnosis included Well's syndrome, granuloma annulare, erythema annulare centrifugum, and EAE.

Biopsies taken from her thigh and back showed superficial and deep perivascular and interstitial lymphocytic inflammation with numerous eosinophils *(Figure 1b–1d)*. Grocott's methenamine silver stain was negative for fungal organisms, and there was no epidermal involvement. There were no flame figures, plasma cells, or evidence of vasculitis—findings consistent with EAE.

DISCUSSION

There is continued debate on whether EAE is a distinct entity or a clinical polymorphism of Well's syndrome. Well's syndrome, also called eosinophilic cellulitis, presents with tender, edematous cellulitis-like lesions with peripheral blood eosinophilia. Prodromal burning and painful edema are usual clinical features. These lesions contain an eosinophilic infiltrate and "flame figures," which are formed from eosinophil degranulation of major cationic protein onto collagen fibers.[6,7] The histological characteristics of EAE are described as a dense superficial and deep perivascular and/or interstitial lymphocytic

Corresponding author: Nicole Dacy, MD, Department of Dermatology, Baylor Scott & White Medical Center – Temple, 2401 S. 31st St., Temple, TX 76508 (e-mail: nicole.dacy@bswhealth.org)

The authors report no conflicts of interest. The case was published with patient permission.
Received March 15, 2021; Revised April 18, 2021; Accepted April 22, 2021.

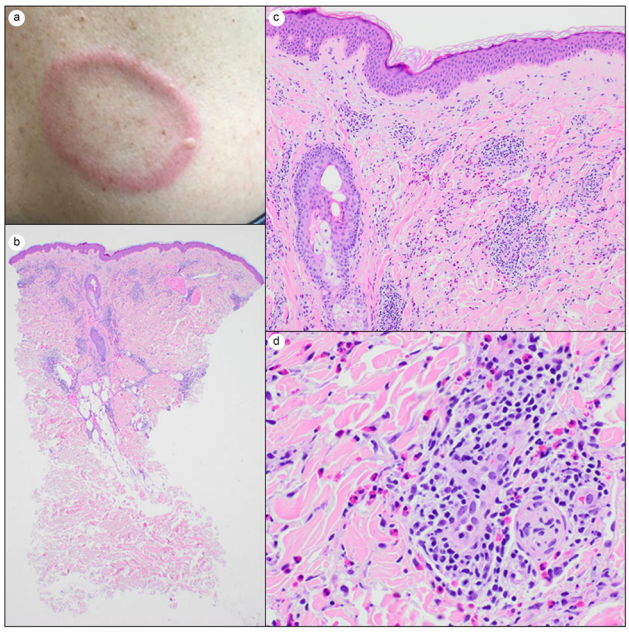

Figure 1. **(a)** Erythematous annular plaque on the chest. **(b–d)** Hematoxylin and eosin stains demonstrating superficial and deep perivascular and interstitial lymphocytic inflammation with numerous eosinophils (b, low power; c, 10× magnification; d, 40× magnification).

infiltration with marked eosinophils and typically lack the characteristic "flame figures" of Well's syndrome,[1–7] which was consistent with our patient's histopathological findings. Epidermal basal layer vacuolar degeneration and mucin deposition can also be seen in EAE, although this is not common.[5]

Our patient's case was also not consistent with other entities on our differential. Granuloma annulare typically affects the dorsal hands and feet with only one or two lesions and less commonly presents with generalized involvement. Histologically, granuloma annulare is characterized by a palisading granuloma with histiocytes and epithelioid cells surrounding a central zone of altered collagen.[8] Erythema annulare centrifugum is the most common gyrate erythema with a characteristic trailing scale at the inner border of the erythema. Histologically, the epidermis will show mild spongiosis and parakeratosis, with the superficial dermis showing lymphocytes tightly around the blood vessels in a "coat sleeve" pattern.[9] Sarcoidosis is known as a "great imitator," and cutaneous annular sarcoidosis could have a similar clinical appearance to EAE. However, histology would show noncaseating granulomas.[10]

For patients with EAE, therapy may be unsatisfactory, with the disease taking a chronic relapsing-remitting course. Spontaneous resolution of the dermatosis can be seen in 4 to 12 months; however, most cases will require treatment. High-potency topical steroids can induce remission. In review of the available literature, systemic steroids are the initial treatment of choice in most cases, with prompt response usually seen within 4 weeks.[1,5,7] Antimalarials such as hydroxychloroquine are also considered first-line treatment, with results similar to steroids.[6,7,11] However, relapse is commonly seen after discontinuing these medications, and resistance can develop even when they are used in combination. In a follow-up study of 10 EAE patients treated with steroids in combination with either hydroxychloroquine or cyclosporine, all 10 participants had a relapse within 14 months.[7] Dapsone and the IL-4 inhibitor dupilumab were reported to induce remission in two cases of EAE.[3,4]

After her diagnosis of EAE, our patient was evaluated by allergy, infectious disease, hematology/oncology, and plastic surgery to look for possible contributing factors. Computed tomography of her chest, abdomen, and pelvis was unremarkable with no concern for an underlying lymphoproliferative disorder. Her breast implants were evaluated and were found to be intact. She was no longer working in an environment with possible mold exposure, and a systemic fungal infection workup was negative. The patient was treated empirically for *Helicobacter pylori* with triple therapy. She is currently on prednisone 20 mg daily to control symptoms; high-dose prednisone clears her lesions. She has been taking hydroxychloroquine 200 mg twice a day for 4 months and is planned to start dapsone or dupilumab if there is no improvement.

In conclusion, EAE is a rare and difficult disease to treat. Response to a variety of therapies is limited and patient quality of life can be affected by lack of response and relapse. With fewer than 30 cases reported, increased awareness of this entity may allow clinicians to more readily diagnose and appropriately manage this condition.

1. Heras MO, Sancho MI, Munoz NP, Millet PU. Eosinophilic annular erythema in adults: report of two cases and review of literature. *An Bras Dermatol*. 2017;92(5 Suppl 1):65–68. doi:10.1590/abd1806-4841.20176373.
2. Lee HS, Yang JY, Kim YC. Eosinophilic annular erythema localized to the palms and the soles. *Ann Dermatol*. 2016;28(6):769–771. doi:10.5021/ad.2016.28.6.769.
3. Gordon S, Robinson S, Abudu M, et al. Eosinophilic annular erythema treated with dupilumab. *Pediatr Dermatol*. 2018;35(4):e255–e256. doi:10.1111/pde.13533.
4. Wallis L, Gilson R, Gilson R. Dapsone for recalcitrant eosinophilic annular erythema: a case report and literature review. *Dermatol Ther*. 2018;8(1):157–163. doi:10.1007/s13555-017-0214-1.
5. Kim YS, Song YM, Seo HM, Bang CH, et al. Eosinophilic annular erythema associated with Churg-Strauss syndrome. *Ann Dermatol*. 2017;29(6):813–814. doi:10.5021/ad.2017.29.6.813.
6. Rongioletti F, Fausti V, Kempf W, Rebora A, Parodi A. Eosinophilic annular erythema: An expression of the clinical and pathological polymorphism of Wells syndrome. *J Am Acad Dermatol*. 2011;65(4):e135–e137. doi:10.1016/j.jaad.2011.05.049.
7. El-Khalawany M, Al-Mutairi N, Sultan M, Shaaban D. Eosinophilic annular erythema is a peculiar subtype in the spectrum of Wells syndrome: a multicentre long-term follow-up study. *J Eur Acad Dermatol Venereol*. 2013;27(8):973–979. doi:10.1111/j.1468-3083.2012.04616.x.
8. Piette EW, Rosenbach M. Granuloma annulare: clinical and histologic variants, epidemiology, and genetics. *J Am Acad Dermatol*. 2016;75(3):457–465. doi:10.1016/j.jaad.2015.03.054.
9. Weyers W, Diaz-Cascajo C, Weyers I. Erythema annulare centrifugum: results of a clinicopathologic study of 73 patients. *Am J Dermatopathol*. 2003;25(6):451–462. doi:10.1097/00000372-200312000-00001.
10. Tchernev G. Cutaneous sarcoidosis: the "great imitator": etiopathogenesis, morphology, differential diagnosis, and clinical management. *Am J Clin Dermatol*. 2006;7(6):375–382. doi:10.2165/00128071-200607060-00006.
11. Kahofer P, Grabmaier E, Aberer E. Treatment of eosinophilic annular erythema with chloroquine. *Acta Derm Venereol*. 2000;80(1):70–71. doi:10.1080/000155500750012685.